



SDMS Doc ID 2014638

THE EMERGENCE OF PERCHLORATE FROM LOCALIZED SITES IN CALIFORNIA TO A NATIONAL CONCERN

Moving Science

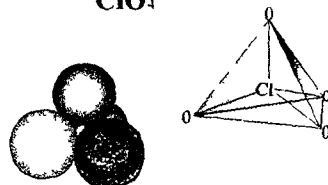
Kevin Mayer, U.S. EPA, Region 9

What is Perchlorate?

- › Solid rocket fuel and oxidizer also found in explosives, fireworks and pyrotechnics
- › Used in over 220 facilities in more than 40 states



PERCHLORATE
 ClO_4^-



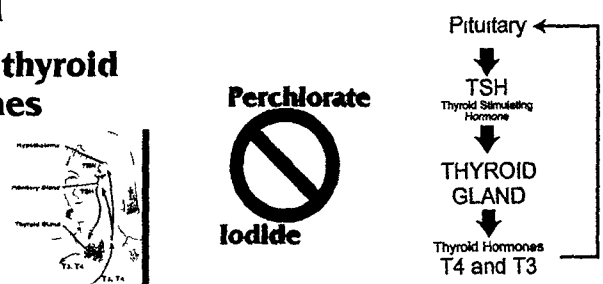
Perchlorate Chemistry

- › Very soluble, mobile, stable anion
- › Moves like salt in water
- › Hard to detect, hard to treat

Why Perchlorate is Toxic

- › Perchlorate blocks iodide uptake in the thyroid
- › Alters production of thyroid and pituitary hormones

Perchlorate Mode of Action



Perchlorate in Drinking Water

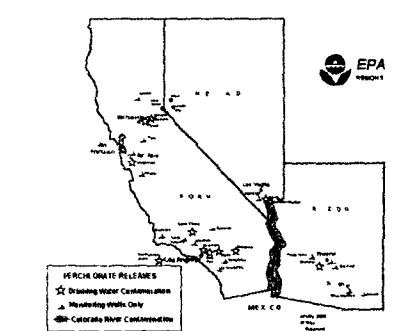
› Releases in 25 states:

Alabama, Arizona, Arkansas, Colorado, Iowa, Kansas, Maryland, Missouri, Massachusetts, Minnesota, Nebraska, Nevada, New Jersey, New Mexico, New York, North Carolina, Oregon, Pennsylvania, Texas, Utah, Virginia, Washington, West Virginia

CALIFORNIA

Over 5,000 water supply wells
315 sources, 49 wells over 18 ppb

By April 2003, perchlorate was measured at 94 sites nationwide.



In Region 9, the 29 known releases affect drinking water for 15 million people.

Toxicology

- › Human drug tests in 1950's
- › EPA's Provisional Reference Dose 1992-95: 4 to 18 ppb in drinking water for adults
- › Children's health and chronic effects were not addressed until 1998
- › Provisional assessment had high levels of uncertainty

CURRENT STATUS - January 2002 DRAFT Report

- › Adult drinking water equivalent at 1 ppb
- › Found effects on brain development of rat pups after dosing mothers at 0.01 mg/kg/day body weight
- › Ecologic Risks Unknown
 - Detected in wild plants, crops and animals (fish, rodents, birds)
- › National Academy of Sciences will review draft report

› State "Advisories"

Arizona... 14 ppb
California... 4 ppb
Maryland... 1 ppb
Massachusetts... 1 ppb
Nevada... 18 ppb
New Mexico... 1 ppb
New York... 5 ppb and 18 ppb
Texas... 4 ppb, 7 ppb or 10 ppb

› Regulatory Authority

A "Characteristic" Hazard
Not a Federally Listed

› Federal Drinking Water

- Drinking water data
- Decision to regulate
- Proposed MCL (MCL)
- Final MCL - 18 to 2
- A public policy priority
- Possible EPA health

Treatment Technologies

- › Ion exchange, reverse osmosis and biologic treatment facilities are being used to treat ground water



Perchlorate Treatment INFORMATION

U.S. EPA Technology Innovation Office
www.clu-in.org/perchlorate

American Water Works Assn Research
www.awwarf.com/research/spperch.asp

May 2000 GWRAC Technology Summary
www.frtr.gov/perchlorate

Vendors



Region 9: The Pacific Southwest

Serving Arizona, California, Hawaii, Nevada, The Pacific Islands, and Tribal Nations



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Kevin Mayer, U.S. EPA, Region 9

Moving Science into Action



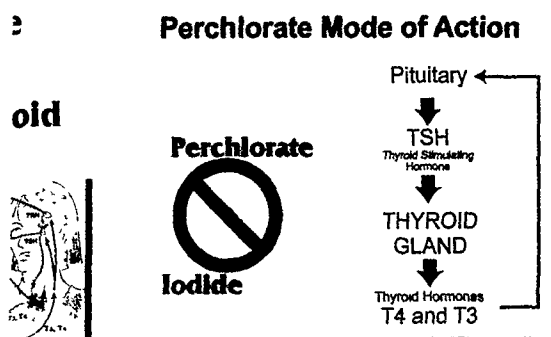
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Toxic



Perchlorate in Drinking Water

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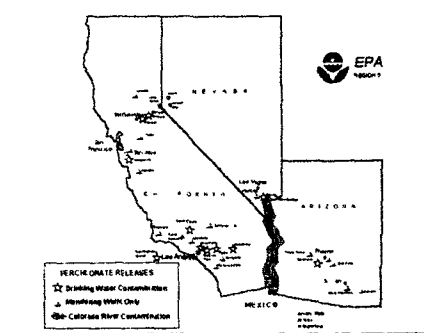
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Regulatory Authority

A "Characteristic" Hazardous Chemical
Not a Federally "Listed" Chemical (SDWA, RCRA, CERCLA)

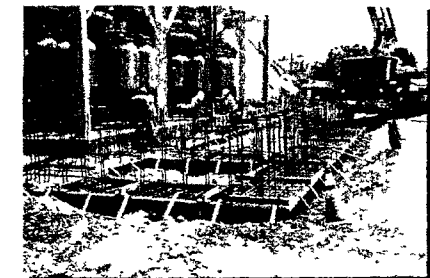
Federal Drinking Water Standards

Safe Drinking Water Act - Office of Water

- Drinking water data collected through 2003
- Decision to regulate, or not - possibly in 2004
- Proposed MCL (MCLG) - 24 months
- Final MCL - 18 to 24 months later (2008?)
- A public policy process - public comment
- Possible EPA health advisory (Office of Water)

Treatment Technologies

- Ion exchange, reverse osmosis and biologic treatment facilities are being used to treat ground water



Ion-exchange resin canisters treating ground water at the Baldwin Park, CA Superfund site.

Perchlorate Treatment INFORMATION

U.S. EPA Technology Innovation Office
www.clu-in.org/perchlorate

American Water Works Assn Research
www.awwarf.com/research/spperch.asp

May 2000 GWRTAC Technology Summary
www.frtg.gov/perchlorate

Vendors



PSG

Perchlorate Study Group (Industry)



Region 9: The Pacific Southwest

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Perchlorate EPA Science Forum

Public presentation - Poster Session

May 5-8, 2003

Washington DC.

Kevin Mayer - author